

**SETSCO SERVICES PTE LTD**

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Website: www.setsco.com
Business Reg. No. 196900269D

TEST REPORT

(This Report is issued subject to the terms & conditions set out below)

Your Ref: -

Our Ref: MM-48154/WC/1

Date: 22 July 2015

Page 1 of 13

Subject : Witnessing of Dimensional Measurement, Pressure & Flow Characteristics Test on Controllable Two Way Pillar Hydrant submitted by Lingjack Engineering Pte Ltd on 21 July 2015.

Tested for : **LINGJACK ENGINEERING WORKS PTE LTD**
No.1 Woodlands Terrace #03-01
Lingjack industrial building
Singapore 738471
Attn: Mr. Lucas

Date & Place of Test : 21 July 2015 at Lingjack Engineering Works Pte Ltd

Method of Test : Based on BS EN 14384: 2005
1) Dimensions (Client's Requirement & BS EN 1092-2 : 1997)
2) Flow Characteristics
3) Leaktightness
4) Mechanical Strength

Description of Sample : One (01) unit of Controllable Two Way Pillar Hydrant was tested as follows:

S/No.	Sample Reference	Brand	Model No.	Size	Emboss Marking	Qty
1	Controllable Two Way Pillar Hydrant	COMBAT	PH-100C	DN 100	COMBAT BS-750 2014 DIA 100	01

Results :

- 1) Dimensions
Refer to Table 1
- 2) Flow Characteristics Test
Refer to Table 2
- 3) Leaktightness Test
Refer to Table 3
- 4) Mechanical Strength Test
Refer to Table 4


WANG CHAO
Testing Officer


MOHAMMAD AZAM
Executive Engineer (Mechanical Testing)
Mechanical Technology Division

Terms & conditions:

- (1) The Report is prepared for the sole use of the Client and is prepared based upon the item submitted, the services required by the Client and the conditions under which the Services are performed by SETSCO. The Report is not intended to be representative of similar or equivalent Services on similar or equivalent items. The Report does not constitute an endorsement by SETSCO of the item.
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Results:**Table 1a: General Dimension Measurement**

Test Method	Sample Ref: Controllable Two Way Pillar Hydrant Size: DN100	Client's Requirements
A (mm)	552.0	Min. 530.0 Max. 570.0
B (mm)	605.0	Min. 600.0 Max. 620.0
C (mm)	100.0	100.0

Refer to Appendix A

Table 1b: Flange Dimension Measurement

Test Method	Sample Ref: Controllable Two Way Pillar Hydrant Size: DN100	BS EN 1092-2: 1997 Requirements
D (mm)	215.0	Nom. 220
K (mm)	179.9	Nom. 180
L (mm)	18.26	Min. 19 Max. 20.5
Bolts	Number	8
	Size	M16
Flange Thickness (mm)	C	29.20
		Min. 16 Max. 23

Refer to Appendix B

Table 2: Flow characteristics

Sample Reference	P ₁ , Inlet Pressure (bar)	P ₂ , Outlet Pressure (bar)	Q, Flow rate (l/m)
Controllable Two Way Pillar Hydrant	2.5	0.5	802.4

Note:

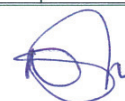
- 1) Pressure Gauge (Brand: TESS, 0~20 bar) Certificate number: PS 144448.
- 2) Pressure Gauge (Brand: TESS, 0~40 bar) Certificate number: PS 145947.
- 3) Flow Gauge (Brand: VM, 140/14bar, Serial Number 1149023) Certificate number: 113725 (Non Singlas Report).

Table 3a: Leaktightness Test (Shell Test)

Sample Reference	Test Duration (min)	Test Pressure (bar)	Results	BS EN 14384: 2005 Requirements
Controllable Two Way Pillar Hydrant	10	25	No leakage	Shall be no sign of leakage past the valve

Table 3b: Leaktightness Test (Seat Test)

Sample Reference	Test Duration (min)	Test Pressure (bar)	Results	BS EN 14384: 2005 Requirements
Controllable Two Way Pillar Hydrant	10	17.6	No leakage	Shall be no sign of leakage past the valve

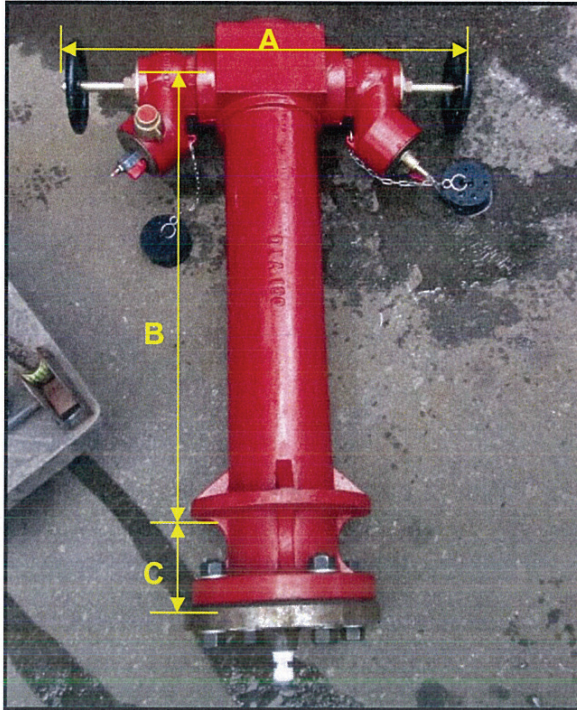



Results:**Table 4: Mechanical Strength Test**

Sample Reference	Results	BS EN 14384: 2005 Requirements
Controllable Two Way Pillar Hydrant	No defects observed	Shall show no sign of defects

Note:

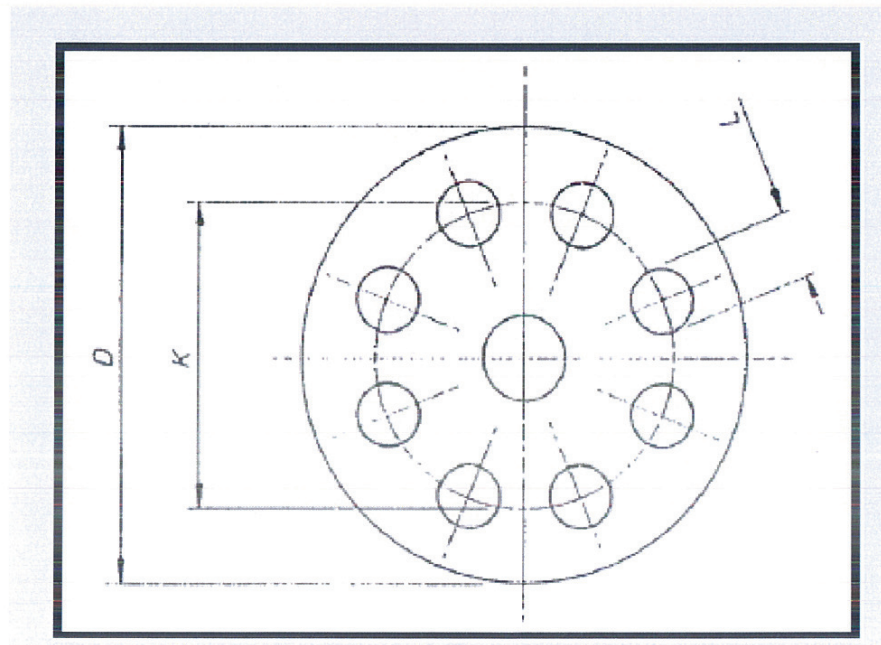
1) Pressure Gauge (Brand: TESS, 0-60 bar) Certificate number: PS 144449.

Appendix A:

Photograph 1 shows Pillar Hydrant tested



Photograph 2 shows Pillar Hydrant under Flow Characteristic Test

Appendix B:



Appendix C:*DIGITAL FLOW GAUGE
CALIBRATION CERTIFICATE*Customer: Lingjack Engineering Works Pte LtdSerial Number: 113725Reference: VM23072 PFPaddlewheel Ref No: S/SteelDigital Display Serial No: 1149023Certificate of conformity: KEMA No.Ex-98.E.1873 XCalibration Mode: Litres per MinuteAccuracy: ± 1% F.S.D.

Static Assembly:

Range: 140/14bar Serial Number: 113725Test Specification: BS EN 837-1 1.6%Tested against: G23113/1.M71 (Traceable to National Standards.)

We hereby certify that the above Digital Flow Gauge has been tested
and conforms to the manufacturers specifications and that the Digital Readout has
been calibrated with the correct detail.

Date: 27/02/2012Signed: A. Lee

For Vernon Morris Utility Solutions Ltd



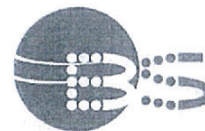
Vernon Morris Utility Solutions Ltd

Chester Road . Bretton . Chester CH4 0DH Tel: (01244) 660794 2 lines

SALES & SERVICE & SPARES

Fax: (01244) 651231



Appendix D-1:**BS TECH PTE LTD**
Your Global Allianz**Calibration Certificate**

CERTIFICATE NO. : PS 144448
SALES ORDER NO. : BSO-14-005187
CUSTOMER : LINGJACK GROUP OF COMPANIES
NO.1 WOODLANDS TERRACE,
SINGAPORE 738471

PAGE: 1 OF 3

INSTRUMENT : PRESSURE GAUGE
MANUFACTURER : WIKA
MODEL NO. : -
SERIAL NO. : -
TAG NO. : -
RANGE : (0 - 20) bar

DATE CALIBRATED : 26-Sep-2014
RECOMMENDED DUE DATE : 26-Sep-2015

AMBIENT TEMPERATURE : (21 ± 2) °C
RELATIVE HUMIDITY : (55 ± 10) % rh

BS Tech's organization and practices have been duly accredited and are compliant to the requirements of ISO/IEC 17025; the laboratory accreditation standard. Our Quality Management System ensures its compatibility with the requirements of ISO 9001.

The reference measurement standards used are traceable to National Metrology Centre,(NMC,SINGAPORE) and/or other National Standards.

MEASUREMENT TRACEABILITY

REFERENCE STANDARDS	TAG NO.	SERIAL NO.	CAL DATE	DUE DATE
PNEUMATIC PRESSURE CALIBRATOR	BS 1481	2750129	3-Jun-2014	3-Jun-2015

CALIBRATED BY: 
C MANIKANDAN

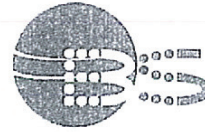
APPROVED BY: 
R G SEKAR

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SAC-SINGLAS
Cert No: LA-2008-0358-C

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Appendix D-2:

TECH PTE LTD

*Calibration Certificate*

CERTIFICATE NO. : PS 144448

PAGE: 2 OF 3

METHOD OF CALIBRATION

The calibration certificate was produced in for the points specified in the relevant in-House Technical Procedure, BSM 02, as defined for the instrument.

The described instrument has been calibrated at BS Laboratory under the ambient conditions stated in the first page.

RESULTS OF CALIBRATION

- ♦ The expanded uncertainty of measurement associated with the calibration is estimated at a confidence level of approximately 95% with a coverage factor of $k = 2$.
- ♦ The results reported herein have been performed in accordance with the laboratory's terms of accreditation under the Singapore Accreditation Council-Singapore Laboratory Accreditation Scheme.

REMARKS

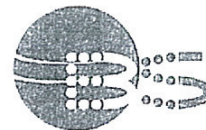
- ♦ The results of the calibration are given on the attached following pages.
- ♦ The results and their associated uncertainties are applicable at the time of calibration.
- ♦ No adjustment was done unless otherwise stated.
- ♦ The user should determine the suitability of the instrument for its intended use.
- ♦ The reports shall not be reproduced except in full, unless the management representative of BS TECH PTE LTD has given approval in writing and comply with the requirements specified in ISO/IEC 17025.

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Appendix D-3:

TECH PTE LTD

*Calibration Certificate*

CERTIFICATE NUMBER: PS 144448

PAGE: 3 OF 3


MEASURED VALUE	ASCENDING	ACTUAL VALUE		ERROR	EXPANDED UNCERTAINTY
		ERROR	DESCENDING		
		bar			% of F.S
0.00	0.000	0.000	0.000	0.000	0.72
5.00	4.981	0.019	4.981	0.019	0.72
10.00	9.944	0.056	9.944	0.056	0.72
15.00	14.907	0.093	14.907	0.093	0.72
20.00	19.886	0.114	19.886	0.114	0.72

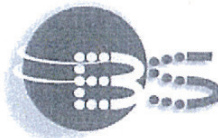
THE UNIT UNDER TEST IS FOUND TO BE WITHIN ± 1.0 % OF F.S

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CALIBRATION

Appendix E-1:


Your Global Alliance



Calibration Certificate

CERTIFICATE NO. : PS 145947 PAGE: 1 OF 3
SALES ORDER NO. : BSO-14-006609
CUSTOMER : LINGJACK GROUP OF COMPANIES
NO.1 WOODLANDS TERRACE,
SINGAPORE 738471

INSTRUMENT : PRESSURE GAUGE
MANUFACTURER : TESS
MODEL NO. : -
SERIAL NO. : -
TAG NO. : -
RANGE : (0 - 40) bar

DATE CALIBRATED : 8-Dec-2014
RECOMMENDED DUE DATE : 8-Dec-2015

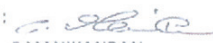
AMBIENT TEMPERATURE : (21 ± 2) °C
RELATIVE HUMIDITY : (55 ± 10) % rh


BS Tech's organization and practices have been duly accredited and are compliant to the requirements of ISO/IEC 17025; the laboratory accreditation standard. Our Quality Management System ensures its compatibility with the requirements of ISO 9001.


The reference measurement standards used are traceable to National Metrology Centre, (NMC, SINGAPORE) and/or other National Standards.

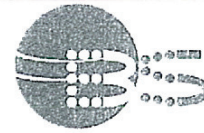
MEASUREMENT TRACEABILITY

REFERENCE STANDARDS	TAG NO.	SERIAL NO.	CAL DATE	DUE DATE
PNEUMATIC PRESSURE CALIBRATOR	BS 1481	2750129	3-Jun-2014	3-Jun-2015

CALIBRATED BY: 
C MANIKANDAN

APPROVED BY: 
R G SEKAR


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SAC-SINGLAS
Cert No: LA-2006-0358-C

Appendix E-2:**TECH PTE LTD***Calibration Certificate*

CERTIFICATE NO. : PS 145947

PAGE: 2 OF 3

METHOD OF CALIBRATION

The calibration certificate was produced in for the points specified in the relevant in-House Technical Procedure, BSM 02, as defined for the instrument.

The described instrument has been calibrated at BS Laboratory under the ambient conditions stated in the first page.

RESULTS OF CALIBRATION

- ♦ The expanded uncertainty of measurement associated with the calibration is estimated at a confidence level of approximately 95% with a coverage factor of $k = 2$.
- ♦ The results reported herein have been performed in accordance with the laboratory's terms of accreditation under the Singapore Accreditation Council-Singapore Laboratory Accreditation Scheme.

REMARKS

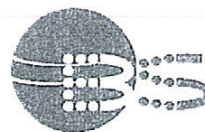
- ♦ The results of the calibration are given on the attached following pages.
- ♦ The results and their associated uncertainties are applicable at the time of calibration.
- ♦ No adjustment was done unless otherwise stated.
- ♦ The user should determine the suitability of the instrument for its intended use.
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Appendix E-3:

TECH PTE LTD

*Calibration Certificate*

CERTIFICATE NUMBER : PS 145947

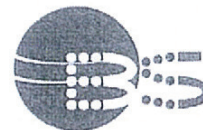
PAGE: 3 OF 3

MEASURED VALUE	ASCENDING	ACTUAL VALUE		ERROR	EXPANDED UNCERTAINTY
		ERROR	DESCENDING		
		bar			% of F.S
0.0	0.00	0.00	0.00	0.00	0.72
10.0	10.06	-0.06	10.06	-0.06	0.72
20.0	20.12	-0.12	20.12	-0.12	0.72
30.0	30.20	-0.20	30.20	-0.20	0.72
40.0	40.36	-0.36	40.36	-0.36	0.72

THE UNIT UNDER TEST IS FOUND TO BE WITHIN $\pm 1.6\%$ OF F.S

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Cert No: LA0000000000

Appendix F-1:**BS TECH PTE LTD**
Your Global Alliance**Calibration Certificate**

PAGE: 1 OF 3

CERTIFICATE NO. : PS 144449
SALES ORDER NO. : BSO-14-005187
CUSTOMER : LINGJACK GROUP OF COMPANIES
NO.1 WOODLANDS TERRACE,
SINGAPORE 738471

INSTRUMENT : PRESSURE GAUGE
MANUFACTURER : TESS
MODEL NO. : -
SERIAL NO. : -
TAG NO. : -
RANGE : (0 - 60) bar

DATE CALIBRATED : 26-Sep-2014
RECOMMENDED DUE DATE : 26-Sep-2015

AMBIENT TEMPERATURE : (21 ± 2) °C
RELATIVE HUMIDITY : (55 ± 10) % rh

BS Tech's organization and practices have been duly accredited and are compliant to the requirements of ISO/IEC 17025; the laboratory accreditation standard. Our Quality Management System ensures its compatibility with the requirements of ISO 9001.

The reference measurement standards used are traceable to National Metrology Centre, (NMC, SINGAPORE) and/or other National Standards.

MEASUREMENT TRACEABILITY

REFERENCE STANDARDS	TAG NO.	SERIAL NO.	CAL DATE	DUE DATE
PNEUMATIC PRESSURE CALIBRATOR	BS 1481	2750129	3-Jun-2014	3-Jun-2015

CALIBRATED BY: 
C MANIKANDAN

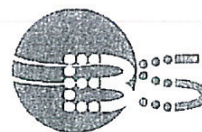
APPROVED BY: 
R G SEKAR

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Cert No: LA-2006-0358-C

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Appendix F-2:

TECH PTE LTD

*Calibration Certificate*

CERTIFICATE NO. : PS 144449

PAGE: 2 OF 3

METHOD OF CALIBRATION

The calibration certificate was produced in for the points specified in the relevant in-House Technical Procedure, BSM 02, as defined for the instrument.

The described instrument has been calibrated at BS Laboratory under the ambient conditions stated in the first page.

RESULTS OF CALIBRATION

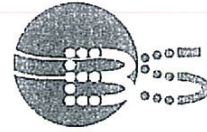
- ♦ The expanded uncertainty of measurement associated with the calibration is estimated at a confidence level of approximately 95% with a coverage factor of $k = 2$.
- ♦ The results reported herein have been performed in accordance with the laboratory's terms of accreditation under the Singapore Accreditation Council-Singapore Laboratory Accreditation Scheme.

REMARKS

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Appendix F-3:**TECH PTE LTD***Calibration Certificate*

CERTIFICATE NUMBER: PS 144449

PAGE: 3 OF 3

MEASURED VALUE	ASCENDING	ACTUAL VALUE		EXPANDED UNCERTAINTY
		ERROR	DESCENDING	
		bar		% of F.S
0.0	0.00	0.00	0.00	0.48
15.0	14.93	0.07	14.93	0.48
30.0	29.88	0.12	29.88	0.48
45.0	44.82	0.18	44.82	0.48
60.0	59.77	0.23	59.77	0.48

THE UNIT UNDER TEST IS FOUND TO BE WITHIN $\pm 1.0\%$ OF F.S

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